

	A	B	C	D	E	F	G	H	I	J	K	L
1	User Selected Options			Background Statistics for Data Sets with Non-Detects								
2												
3	Date/Time of Computation			7/30/2013 12:32:44 PM								
4	From File			WorkSheet.xls								
5	Full Precision			OFF								
6	Confidence Coefficient			95%								
7	Coverage			95%								
8	rent or Future K Observations			1								
9	mber of Bootstrap Operations			2000								
10												
11	DDx											
12												
13	General Statistics											
14	Total Number of Observations				65	Number of Missing Observations					0	
15	Number of Distinct Observations				59							
16	Number of Detects				45	Number of Non-Detects					20	
17	Number of Distinct Detects				45	Number of Distinct Non-Detects					14	
18	Minimum Detect				0.2	Minimum Non-Detect					0.18	
19	Maximum Detect				3.41	Maximum Non-Detect					1.8	
20	Variance Detected				0.7	Percent Non-Detects					30.77%	
21	Mean Detected				1.852	SD Detected					0.837	
22	Mean of Detected Logged Data				0.46	SD of Detected Logged Data					0.654	
23												
24	Critical Values for Background Threshold Values (BTVs)											
25	Tolerance Factor K (For UTL)				2	d2max (for USL)					3.057	
26												
27	Normal GOF Test on Detects Only											
28	Shapiro Wilk Test Statistic				0.956	Shapiro Wilk GOF Test						
29	5% Shapiro Wilk Critical Value				0.945	Detected Data appear Normal at 5% Significance Level						
30	Lilliefors Test Statistic				0.106	Lilliefors GOF Test						
31	5% Lilliefors Critical Value				0.132	Detected Data appear Normal at 5% Significance Level						
32	Detected Data appear Normal at 5% Significance Level											
33												
34	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
35	Mean				1.431	SD					0.949	
36	95% UTL95% Coverage				3.329	95% KM UPL (t)					3.027	
37	90% KM Percentile (z)				2.647	95% KM Percentile (z)					2.992	
38	99% KM Percentile (z)				3.638	95% KM USL					4.331	
39												
40	DL/2 Substitution Background Statistics Assuming Normal Distribution											
41	Mean				1.434	SD					0.942	
42	95% UTL95% Coverage				3.318	95% UPL (t)					3.018	
43	90% Percentile (z)				2.641	95% Percentile (z)					2.984	
44	99% Percentile (z)				3.625	95% USL					4.313	
45	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
46												
47	Gamma GOF Tests on Detected Observations Only											
48	A-D Test Statistic				1.403	Anderson-Darling GOF Test						
49	5% A-D Critical Value				0.755	Data Not Gamma Distributed at 5% Significance Level						
50	K-S Test Statistic				0.168	Kolmogrov-Smirnoff GOF						
51	5% K-S Critical Value				0.133	Data Not Gamma Distributed at 5% Significance Level						
52	Data Not Gamma Distributed at 5% Significance Level											
53												
54	Gamma Statistics on Detected Data Only											
55	k hat (MLE)				3.351	k star (bias corrected MLE)					3.143	
56	Theta hat (MLE)				0.553	Theta star (bias corrected MLE)					0.589	
57	nu hat (MLE)				301.6	nu star (bias corrected)					282.9	
58	MLE Mean (bias corrected)				1.852							
59	MLE Sd (bias corrected)				1.045	95% Percentile of Chisquare (2k)					13.02	
60												
61	Gamma ROS Statistics using Imputed Non-Detects											
62	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											

	A	B	C	D	E	F	G	H	I	J	K	L
63	GROS may not be used when kstar of detected data is small such as < 0.1											
64	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
65	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
66	Minimum				0.2	Mean				1.511		
67	Maximum				3.41	Median				1.164		
68	SD				0.871	CV				0.577		
69	k hat (MLE)				2.674	k star (bias corrected MLE)				2.561		
70	Theta hat (MLE)				0.565	Theta star (bias corrected MLE)				0.59		
71	nu hat (MLE)				347.6	nu star (bias corrected)				332.9		
72	MLE Mean (bias corrected)				1.511	MLE Sd (bias corrected)				0.944		
73	95% Percentile of Chisquare (2k)				11.26	90% Percentile				2.775		
74	95% Percentile				3.32	99% Percentile				4.512		
75	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
76	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
77					WH	HW					WH	HW
78	Approx. Gamma UTL with 95% Coverage				3.88	4.042	95% Approx. Gamma UPL				3.351	3.446
79	95% Gamma USL				6.031	6.584						
80												
81	The following statistics are computed using gamma distribution and KM estimates											
82	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
83	k hat (KM)				2.278	nu hat (KM)				296.1		
84					WH	HW					WH	HW
85	Approx. Gamma UTL with 95% Coverage				4.328	4.621	95% Approx. Gamma UPL				3.641	3.813
86	95% Gamma USL				7.22	8.245						
87												
88	Lognormal GOF Test on Detected Observations Only											
89	Shapiro Wilk Test Statistic				0.846	Shapiro Wilk GOF Test						
90	5% Shapiro Wilk Critical Value				0.945	Data Not Lognormal at 5% Significance Level						
91	Lilliefors Test Statistic				0.182	Lilliefors GOF Test						
92	5% Lilliefors Critical Value				0.132	Data Not Lognormal at 5% Significance Level						
93	Data Not Lognormal at 5% Significance Level											
94												
95	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
96	Mean in Original Scale				1.465	Mean in Log Scale				0.149		
97	SD in Original Scale				0.911	SD in Log Scale				0.733		
98	95% UTL95% Coverage				5.026	95% BCA UTL95% Coverage				3.029		
99	95% Bootstrap (%) UTL95% Coverage				3.043	95% UPL (t)				3.98		
100	90% Percentile (z)				2.969	95% Percentile (z)				3.874		
101	99% Percentile (z)				6.383	95% USL				10.9		
102												
103	Background DL/2 Statistics Assuming Lognormal Distribution											
104	Mean in Original Scale				1.434	Mean in Log Scale				0.0811		
105	SD in Original Scale				0.942	SD in Log Scale				0.823		
106	95% UTL95% Coverage				5.622	95% UPL (t)				4.327		
107	90% Percentile (z)				3.113	95% Percentile (z)				4.197		
108	99% Percentile (z)				7.353	95% USL				13.41		
109	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
110												
111	Nonparametric Distribution Free Background Statistics											
112	Data appear to follow a Discernible Distribution at 5% Significance Level											
113												
114	Nonparametric Uppper Limits for BTVs(no distinction made between detects and nondetects)											
115	Order of Statistic, r				64	95% UTL with95% Coverage				3.043		
116	Approximate f				1.684	Confidence Coefficient (CC) achieved by UTL				0.842		
117	95% UPL				2.961	95% USL				3.41		
118	95% KM Chebyshev UPL				5.598							
119												
120	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											
121	data set free of outliers and consists of observations collected from clean unimpacted locations.											
122	The use of USL tends to provide a balance between false positives and false negatives provided the data											
123	represents a background data set and when many onsite observations need to be compared with the BTV.											
124												